

**France & US Nuclear Programs: What we can learn from each other
at the
2010 General Assembly – SFANS (French Local Section of the ANS)
(in French – Section Francaise de l'ANS)**

**UICP Conference Center, Stepherson Room, 16 rue Jean Rey, Paris 15eme
September 16, 2010**

**Remarks by Eric P. Loewen, Ph.D.
Vice President/President Elect
American Nuclear Society**

Good evening. I am privileged to have been invited to be with you. Jean-Claude Gauthier, President of Section Francaise de l'ANS (SFANS), thank you for your communications and guidance. Also, to Dominique Greneche, Immediate Past President of SFANS/ANS, Board Member, and to France Bres-Tutino, SFANS Board Member/ANS International Committee Chair, thank you for your efforts during and subsequent to the 2010 ANS Annual Meeting, which have been very helpful.

To the members of the SFANS - I salute you. In 1970, the SFANS - France's Local Section of the ANS - received its American Nuclear Society charter, one of the first ANS chapters in Europe. Leaders then, and leaders now. Last year, this section hosted then-ANS President Tom Sanders on the occasion of the at that meeting AREVA's Chalon/St. Marcel Plant received an ANS Nuclear Historic Landmark Award for the long safe operations. This historical blend, the awards, our bond is what brings me - us - to this 2010 SFANS General Assembly event tonight.

Tonight I will address the following areas: our ANS mission and some emerging issues in R&D and waste disposal, and close with how we can learn from each other.

Our common ANS Mission:

First let me address our ANS mission. I see our focus, the mission of our technical society for the stewardship of the technical information that it's members and others, to generate supportive research in the nuclear sciences and technologies – the NS&Ts – our technical core. This is our core. The ANS core that generates the energy that holds our society together.

Let us recall our response to the Atoms for Peace program. The ANS was formed in 1954 to serve as the technical steward of NS&T information... to develop, collect, organize, document

and share information for all NS&T applications – for energy, medicine, industry, food, and space. Sometimes we get too focused on power generation and forget the many other technical disciplines within ANS that are pushing the boundaries of the NS&Ts. The ANS mission is accomplished by advancing the broad nuclear science and technology professional by providing those professionals with an opportunity for professional development by honing their leadership and technical skills.

How does ANS accomplish our mission? We accomplish our mission by providing membership value through our 19 active technical divisions, three technical groups, three technical publications, two professional publications, the Society tabloid, ANS NEWS, the conduct of numerous national and topical meetings, and other related professional activities. Let us not forget the many standing committees, such as the International Committee, who continue the relationships that bring me here tonight.

Today, more than ever, we nuclear professionals must continue implementing this mission. I think ANS must stay the course by accomplishing the following:

- (1) Electronically archive all issues of previous publications. This is stewardship. This is our duty. We must make this NS&T repository information more accessible in the digital age. To go forward toward the future, any organized body of information must not lose the past achievements and failures, lest they be repeated.
- (2) Maintain and further enhance the scope and efforts of in ANS Nuclear Standards development. That's what we do best. Our ANS/ANSI Standards are recognized worldwide. By putting stakeholders, competitors, and regulators together in one room, and with accepted processes to create, hone and then implement the standards, we gain consensus on the requirements. This produces the high standards to which we hold ourselves. Standards for continued and safer operation of nuclear power plants, for safe disposal of nuclear waste, for safe transport of nuclear materials... the safe application and acceptance of all our NS&Ts across society.
- (3) We need to work cooperatively with related organizations - SFANS and other ANS International Local Sections, the IAEA, the ANS Agreement Societies (which includes many national nuclear societies and the OECD/NEA), the INSC, and the PNC – for the mutual benefit of all partners. We need to encourage more co-sponsored meetings – again for the mutual benefit of BOTH (all) organizations. We currently share a relatively small number of international meetings. We co-sponsor CONTE, ICAPP, GLOBAL, LWR Fuel Management, etc. And again we recognize and appreciate the positive contributions of SFANS to co-sponsorship of these and of other ANS National and Topical Meetings. These accomplishments can continue only with your good cooperation.

Our Emerging Future

What are the emerging technical futures in which our society will play a major role? There are a few examples that I am seeing domestically in the areas of small modular reactors, university research and supporting the Efforts on the Blue Ribbon Commissions. Our key to the future, our key to success is continuing the participation and making the technical contributions from the ANS membership in these areas.

Small Modular Reactors:

Earlier this year, U.S. Secretary of Energy Steven Chu stated that as we build a new generation of clean and safe nuclear plants, we are constantly looking ahead to the future of nuclear power. One of the promising technologies is small modular reactors (SMRs).

The ANS SMR Special Committee is leading the nuclear science and engineering community by organizing a forum for technical dialogue on SMR licensing issues. The Committee has members from more than three dozen organizations representing all relevant stakeholders. The ANS SMR Special Committee solutions to SMR generic licensing issues will be issue driven and focused on technology neutral solutions. More importantly, they will be driven by Science. The SMR is a technology that is gaining international interest and I give credit to President Tom Sanders for pushing this issue and raising awareness.

University-Led Research

I am pleased to share with my French Colleagues that my DOE consolidated its university support to what is now called the Nuclear Energy University Programs (NEUP). The US DOE Nuclear Energy directorate has designated that 20 percent of funds appropriated to its R&D programs will be competitively bid to universities. What are the results?

This past May, Secretary Chu announced that 42 university-led research and development projects were awarded \$38MM for nuclear energy related research – to advance nuclear education while developing the next generation of nuclear technologies.

The research area that I most appreciate is the Generation IV Reactor Research and Development, with 20 projects that allocated \$20MM. This type of R&D will accelerate the **deployment** of the next generation of nuclear reactors that will produce more energy and create less waste. With the advancing research on crosscutting technologies in the area of fuels, materials, and reactor modeling, I hope that, as a collective group, we can focus on a project to build something. Even something small. It is the act of building something tangible that expands options, grows and captures wisdom, and stirs the passion of individuals to do more.

Educational support requires more than bricks and mortar. It also needs scholarships and fellowships to recruit and train the next generation of nuclear scientists and engineers – the ones who will follow us, who will learn from us - the technical infrastructure of ANS. The funding in this area is about \$5MM providing more than 100 scholarships/fellowships to students who are studying our NS&Ts.

Blue Ribbon Commission

When our new U.S. administration declared that Yucca Mountain was no longer an option for repository storage of spent nuclear fuel, U.S. President Obama established a Blue Ribbon Commission on America's Nuclear Future (the BRC). This occurred during Dr. Sander's term as ANS President.

Among many in the technical community, the ANS was disappointed in this government decision. We had previously issued ANS's Position Statement 80 "Licensing of Yucca Mountain as a Geological Repository for Radioactive Wastes," to encourage (1) the development and use of geological repositories for disposal of high-level radioactive wastes, and (2) expeditious processing of the Yucca Mountain license application in an open, technically sound manner.

Why does the ANS support the completion of the ongoing licensing process when the political winds are blowing in the opposite direction? Because, as a technical community we recognize that geologic repository management of spent nuclear is a better option than deep sea burial or launching it into outer space. The ANS has declared that we believe the repository program should be adequately funded to pursue the license. If the license fails for technical reason, then we all learn why and can advance a better solution. If Yucca Mountain repository passes the licensing process but fails political approval, then we have also learned that we got it right technically, but failed to win support of the public. As I stand before you tonight, the fate of underground repository of spent nuclear fuel in the United States is held thrall to the U.S. legal system.

Let me share, for my French colleagues, how the BRC came about. President Obama issued a memorandum to Energy Secretary Chu which positively recognized that the expansion of U.S. nuclear energy is crucial for the following three reasons: support U.S. climate change policy, enhance U.S. energy security, and increase world-wide economic prosperity. In the next paragraph, the memorandum acknowledges that our long-term domestic nuclear energy strategy must have "a well-considered policy for managing used nuclear fuel and other aspects of the back end of the nuclear fuel cycle." This new approach is hoping to re-direct the efforts of scientists and engineers from the past 20 years toward a search for a different approach to repository storage of spent nuclear fuel.

I believe that the key sentence in this memo is “. . . the Commission should consider a broad range of technological and policy alternatives, and should analyze the scientific, environmental, budgetary, economic, financial, and management issues, among others, surrounding each alternative it considers.”

How has your ANS responded? Past President Sanders established a special committee titled “Used Nuclear Fuel Management Options.” The Committee Chair is Audeen Fentiman and the members are Lake Barrett, Yoon Chang, Margaret Chu, Mike Corrandini, Kenneth Hughey, Donna Jacobs, Linda Kinnard, Kathy McCarthy, Craig Piercy, Dana Powers, and Dan Stout. This special committee is compiling a report that analyzes the advantages and disadvantages of various approaches for managing the back end of the nuclear fuel cycle.

At the first BRC public meeting, then ANS President Tom Sanders testified, emphasizing the relevant technical expertise of the ANS membership, and he offered the commission access to a forthcoming ANS report on the challenges and advantages of various nuclear fuel cycle alternatives (being developed by the ANS Special Committee on Used Nuclear Fuel Management Options). Dr. Sanders urged the Commission to consider reforming the operational mechanics of the nuclear fuel cycle by recommending creation of an independent entity to oversee the management of used nuclear fuel in the U.S.

Continuing, Sanders advocated the adoption of a “cradle-to-grave” policy that would enable the U.S. to export nuclear fuel, goods, and services and then accept the used nuclear fuel, thereby minimizing the threat of proliferation. Sanders called for a sense of urgency in completing the Commission’s overall tasks, challenging the Commission to minimize political influence on its decisions with respect to used nuclear fuel management.

The Commission’s Subcommittee on Reactors and Fuel Cycle Technologies invited the ANS to address a 30 August meeting regarding Small Modular Reactors, and what their role could be in a new future for nuclear power. Dr. John Kelly’s testimony (available on the www.brc.gov website) declared that the ANS has encouraged a dialogue between SMR developers and the U.S. Nuclear Regulatory Commission (NRC) in pursuit of their – the NRC – desire that “the SMR community should provide a consensus approach.” Dr. Kelly is a Co-Chair of the ANS Special Committee on SMR Generic Licensing Issues.

As leaders in our Nuclear Science and Technology community, we need to stay tuned as the Commission produces interim and then final reports to the US Government. Although the Commission does not have any decision making authority, I am sure their recommendations will be closely followed not only in the U.S. Congress. Let’s us remain vigilant on this issue.

The Role of Governments

I close tonight with some information I learned from a sector of the society that we technologists may not be particularly informed about – the entertainment sector. Less than 1 year ago, my work at GE Hitachi Nuclear Energy was featured in the December 2009 of Esquire Magazine. This put me in the same room with an author, a film financier, a former U.S. attorney general, economists, medical Doctor, and others. Tonight I highlight one of my compatriots by name, Claire Lockhart. Ms. Lockhart was coauthor with Ashraf Ghani for the book titled “Fixing Failed States.” It was written from their wisdom gained in working in Afghanistan. It sounded the clarion call for ‘how **DO** you fix a government? I recommend you read this book, as it has some parallels to implementing long term nuclear policy. The book addresses ten things a government must do to fulfill their citizens’ needs. As you expect, most are logical - Rule of Law, control of violence, administrative control, sound management of public finance, Investments in human capital, citizens’ rights through public policy, infrastructure services, formation of market, management of public assets, and effective public borrowing.

So what does this have to do with us nuclear technologists? What can we learn from Ms. Lockhart? What can we learn from each other... and from the U.S... and from France?

When I look at the French nuclear complex and the ten basic functions of the State, your long-term investment of nuclear energy was the highest form of administrative control, infrastructure services, and management of public assets. The use of MOX fuel in your country has shown that your government has the staying power to implement a nuclear policy because of No oil, No coal, No choice. Tomorrow I will tour La Hague to learn more about your technical and operational achievements.

When I compare U.S. nuclear waste policy against the ten basic functions of the State, I see short comings in our areas of rule of law, administrative control, investments in human capital, and formation of a market. The U.S. is in a long term technology process that extends beyond many of our election cycles. In the U.S. this causes problems in the areas of infrastructure services, making nuclear markets, and the effective use of public funds. Simply put, this represents risk in the U.S. nuclear market. This issue of spent nuclear fuel non-disposal ultimately causes more economic harm across our society. It shakes the technical and political confidence to get something done.

For a technical example of policy disruption, look at “Geologic Repository Performance Models.” They have been discredited as it too complex to predict the future performance of repository. Yet, significantly more complex climate models are considered as gospel.

This open-to-the-general-whim [opacity-based] policy development impedes the necessary science- and business based-commercial risk-definition and acceptance. This adds to cost by creating uncertainty of return on investment. This slows advancement of technologies due to uncertainty of future change in regulation. Need we wonder why there are no new builds in the U.S.? The absence of firm government policy makes the business future difficult to predict. This instability in government nuclear policy is deterring confidence in nuclear-directed investment. Stability and clarity - the ability to sense with confidence the potential IRR (internal rate of return) - will convince stakeholder to make investments.

I hope that our U.S. Blue Ribbon Commission on America's Nuclear Future develops its recommendations with opacity. Opacity in the process to open a repository. Opacity in the definition of what is defined as waste. Opacity of consequences for placing transuranics in an underground repository. Opacity in the time-line for repository management, etc, etc. etc.

I suggest that we in the U.S. take inventory of your French success with both commercial scale aqueous separations and the use of MOX in water cooled reactors. A significant lesson for the larger international technical community to study is the policy of management of LWR used nuclear, fuel not only here in France, but in the UK and Japan. You - these - governments have stayed the course... followed a policy. The United States needs to learn from your successes with reprocessing and the application of LWR recycling. That learning needs also to include best practices, and economics.

So that there is no misunderstanding, I reiterate that I do not say that reprocessing or "recycling plutonium" by any nation is wrong. The ANS has many members, member companies, and position statements supporting the use of MOX fuel. My statement is that the U.S. should now evaluate a different approach that could fully recycle all the transuranics in a fast spectrum cooled recycling reactor. Simply put, full recycling can ultimately extract more than 95% of the available energy from uranium ore. France's current fast reactor program recognizes this. We all know that water reactors can extract only about 1% of the available energy from uranium. And we all know that reprocessing with LWRs extracts only about 2% more energy from the original energy content of uranium.

To explore and define and select different approaches for our technical community, I look to your support to leap-frog current options. Be revolutionary to commercialize fast reactors, rather than continue slowly along the evolutionary policies of today. I suggest a technical revolution using the technologies long studied to provide the energy needs of our world.

As technologists, leaders, and world citizens let us continue the development of nuclear science and technology.

I wish you all very good lives.